Polyamine

From Wikipedia, the free encyclopedia

The **polyamines** are organic compounds having two or more primary amino groups - such as putrescine, cadaverine, spermidine, and spermine - that are growth factors in both eucaryotic and procaryotic cells. Though it is known that polyamines are synthesized in cells via highly-regulated pathways, their actual function is not entirely clear. As cations, they bind to DNA, and, in structure, they represent compounds with cations that are found at *regularly-spaced intervals* (unlike, say, Mg^{++} or Ca^{++}, which are point charges).

If cellular polyamine synthesis is inhibited, cell growth is stopped or severely retarded. The provision of exogenous polyamines restores the growth of these cells. Most eukaryotic cells have a polyamine transporter system on their cell membrane that facilitates the internalization of exogenous polyamines. This system is highly active in rapidly proliferating cells and is the target of some chemotherapeutics currently under development.[1]

Polyamines are also important modulators of a variety of ion channels, including NMDA receptors, AMPA receptors, and Inward-rectifier potassium ion channels.

Cyclen is the main representative of a class of cyclic polyamines. Polyethylene amine is a polymer based on aziridine monomer.

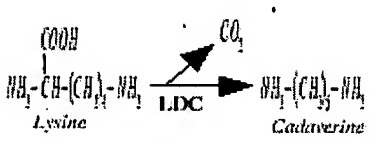
Contents

Synthesis of linear polyamines

Putrescine

Putrescine is synthesized biologically via two different pathways, both starting from arginine. In one pathway, arginine is converted into agmatine, with a reaction catalyzed by the enzyme arginine decarboxilase (ADC); then agmatine is transformed into carbamilputrescine by agmatine imino hydroxilase(AIH). Finally, carbamilputrescine is converted into putrescine. In the second pathway, arginine is converted into ornithine and then ornithine is converted into putrescine by ornithine decarboxylase (ODC).

Cadaverine

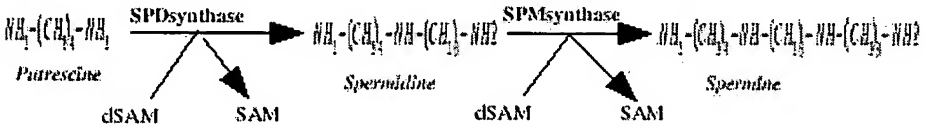


Cadaverine is synthesized from lysine in a one-step reaction with lysine decarboxylase (LDC).

Spermidine and spermine

Spermidine is synthesized from putrescine, using an aminopropylic group from decarboxylated S-adenosil-L-methionine (SAM). The reaction is catalyzed by spermidine synthase.

Spermine is synthesized from the reaction of spermidine with SAM in the presence of the enzyme spermine synthase .



External links

- Polyamines in cell cycle proliferation and cell death
- Ornithine Decarboxylase: Expression and regulation in rat brain and in transgenic mice, 2002, Pekka Kilpelainen, Department of Biochemistry, University of Oulu. Extensive review of literature through 2001 on polyamine structure, properties, metabolism in mammals, and physiological and pathophysiological roles (See article Table of Contents)

Plant hormones [hide]
Abscisic acid - Auxins - Cytokinins - Ethylene (Ethene) - Gibberellins
Brassinosteroids - Jasmonates - **Polyamine** - Salicylic acid

Categories: Amines | Polyamines | Plant hormones

Polyamide

From Wikipedia, the free encyclopedia

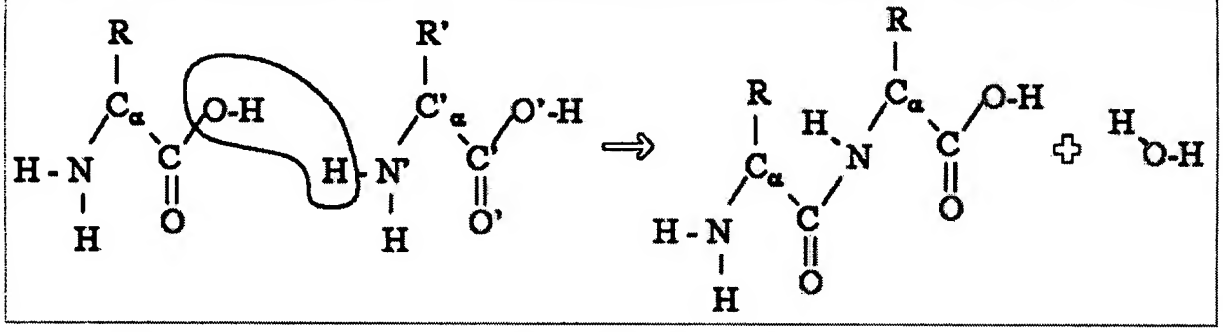
A **polyamide** is a polymer containing monomers joined by peptide bonds. They can occur both naturally, examples being proteins, such as wool and silk, and can be made artificially, examples being Nylons, Aramids, and sodium poly(aspartate).

Production from monomers

The amide link is produced from the condensation reaction of an amino group and a carboxylic acid or acid chloride group. A small molecule, usually water, ammonia or hydrogen chloride, is eliminated.

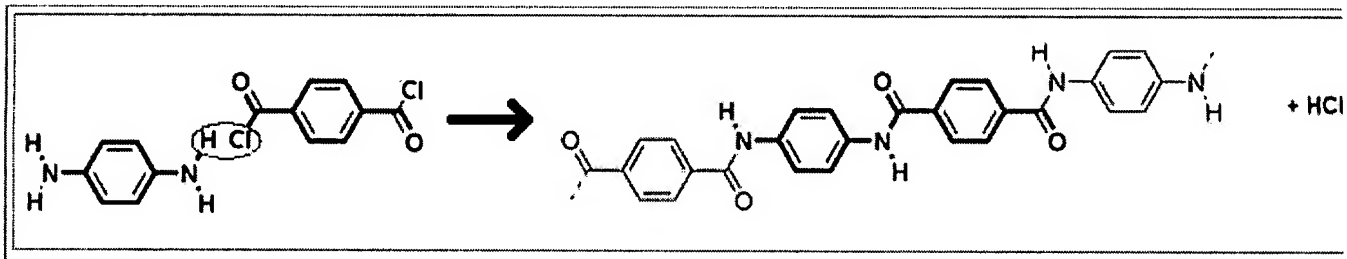
The amino group and the carboxylic acid group can be on the same monomer, or the polymer can be constituted of two different bifunctional monomers, one with two amino groups, the other with two carboxylic acid or acid chloride groups.

Amino Acids can be taken as examples of single monomer (if the difference between R groups is ignored) reacting with identical molecules to form a polyamide:



The reaction of two amino acids. Many of these reactions produce long chain proteins

Aramid (pictured below) is made from two different monomers which continuously alternate to form the polymer and is an aromatic polyamide:



The reaction of 1,4-phenyl-diamine (para-phenylenediamine) and terephthaloyl chloride to produce Aramid

Plastics

Polyethylene (PE)	Polypropylene (PP)	Polystyrene (PS)
Polyethylene terephthalate (PET or PETE)	**Polyamide** (PA)	Polyester
Polyvinyl chloride (PVC)	Polycarbonate (PC)	Acrylonitrile butadiene styrene (ABS)
Polyvinylidene chloride (PVDC)	Polytetrafluoroethylene (PTFE)	Polymethyl methacrylate (PMMA)
Polylactic acid (PLA)		

Retrieved from "http://en.wikipedia.org/wiki/Polyamide"

Categories: Plastics | Polyamides | Dielectrics